(c) Remarks

The claims are 20-23 with claim 20 being independent. Support for claim 20 can be found, inter alia, on page 12, lines 14 and 15. Support for claims 21-23 can be found, inter alia, in Exemplary Compounds 1, 3 and 5 on page 14 and in Examples 1, 10, 11 and 19.

Former claims 1-9 were rejected as obvious over EP '980 or its equivalents: JP 2001-131174 or USP 6,972,334 (USP '334) B1. In EP '980 compound RN# 338734-80-8 (the compound in Example 4) or in USP '334, Compound 133 (also in Example 4) is relied upon as teaching a similar compound with a difference in the position at which the fluorenyl is attached. For the Examiner's benefit a JP website machine translation of JP2001-131174A is attached.

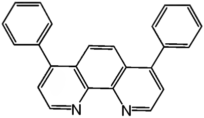
The Rule 132 Declaration filed, showing that Compound 133 could not be synthesized, was not deemed persuasive because several differences between the synthesis attempted in the Declaration and the synthesis in Example 4 of US '334 existed; namely, in the solvent system used for extraction and in purification/crystallization. Furthermore, it was argued even if the Compound 133 was not enabled, that similar compounds can be made with similar activity. The grounds of rejection are respectfully traversed.

Prior to addressing the grounds of rejection applicants wish to briefly review certain key features and advantages of the present claimed invention. The organic light-emitting device, which includes the phenanthroline compound set forth in Claim 20, is excellent in durability because the compounds have bulky fluorenyl groups. In the novel fluorenyl group-substituted phenanthroline compounds of the present invention, since the phenanthroline skeleton is substituted with fluorenyl groups via the 2-position of the fluorenyl groups, a conjugated system can readily extend over the entire molecule because of the direct connection between the conjugations of the fluorenyl groups and the phenanthroline skeleton. Accordingly, a high electron mobility is present when the compounds are formed into a thin film. Therefore, the compounds can preferably be used for an electron-transporting layer and can also be used for an emission layer because of their low-voltage drivability.

Furthermore, since the phenanthroline skeleton has no substituents other than the fluorenyl groups, the compound has a wide bandgap. Therefore, when used for an electron-transporting layer of an organic light-emitting device, it is possible to prevent energy generated by an emission layer from being transferred to layers beyond the emission layer.

Moreover, because of their wide bandgap, when used for an emission layer, the instant compounds can be adopted not only for an organic green-light-emitting device, but also for an organic blue-light-emitting device.

EP '980 and its equivalents exemplify a bathophenanthroline compound for use in an organic light-emitting device. The phenanthroline skeleton is substituted with phenyl groups at the 4- and 7-positions of the skeleton as follows:



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In the compounds enumerated in columns 45-48 of USP '334 a bathophenanthroline skeleton is substituted with two 9-position fluorenyl groups at the 2- and 9-positions of the bathophenanthroline skeleton. Furthermore, in the compounds disclosed in USP '334, the phenanthroline skeleton has two different kinds of substituents; namely, phenyl and fluorenyl or phenylmethylene.

To the contrary, in the compounds set forth in present claim 20 a phenanthroline skeleton is substituted with only fluorenyl groups at any of the 2-, 3- and 4-positions and any of the 7-, 8- and 9-positions of the phenanthroline skeleton. No phenyl substitution is present. The phenanthroline skeleton set forth in instant claim 20 has no substituents, other than the two 2-position fluorenyl groups. Therefore, the phenanthroline compounds set forth in claim 20 are quite different from the bathophenanthroline compounds disclosed in EP '980 and its equivalents.

Furthermore, the phenanthroline compounds set forth in claim 20 are not obvious from the disclosure of EP '980.

The phenanthroline compounds set forth in claim 20 have a structure such that the phenanthroline skeleton is substituted with fluorenyl groups through the 2-position of the fluorenyl groups and, therefore, the compounds exhibit high electron-transportability. Moreover, the phenanthroline skeleton has no substituents other than the two, 2-position fluorenyl groups and, therefore, exhibits a wide bandgap.

On the other hand, the bathophenanthroline compounds disclosed in EP '980 contain two phenyl groups in addition to fluorenyl groups and, therefore, have a narrower bandgap than that of phenanthroline compounds which are not substituted with phenyl groups.

Furthermore, with regard to any differences between the synthesis disclosed in Example 4 of USP '334 and the synthesis actually attempted in the Declaration, the Examiner is directed to Paragraph 8 of Declaration. The declarant stated that "several minor changes in amounts of solvent, starting material and reaction time were made to expedite the synthesis." It was stated further "Any such changes <u>were not sufficient to adversely effect the synthesis</u>." (emphasis supplied) Each change was pointed out to the Examiner. Furthermore, in the Amendment dated September 5, 2008 on page 7, last paragraph, it was specifically noted that the Rule 132 Declaration attempted the synthesis of Example 4, "with trivial changes which did not affect the results."

Under MPEP § 716.02(e) where a comparison is not identical with the reference disclosure, deviations therefrom should be explained. Deviations from the compared example were deemed inconsequential in <u>In re Armstrong</u> 126 USPQ 281 (CCPA-1960).

Here, the declarant has fully complied with MPEP 716.02(e) and controlling case authority since any deviations were pointed out and explained and were stated to be insignificant. No more is required. The Examiner should confirm on the record that Compound 4 of EP '980 is not enabled.

An explanation as to why the attempted synthesis of Compound 4 failed was presented in the Amendment dated September 5, 2008 on page 8. Applicants explained therein that the large steric hindrance of the phenyl groups fused to the cyclopentane ring at the 9-position interfere with the bond from the cyclopentane to the phenanthroline skeleton. Since in the present compounds the bond to the phenanthroline skeleton is through a phenyl group and not through the cyclopentane ring, the bond is not subject to such steric hindrance.

Accordingly, the position at which the phenanthroline and fluorine skeletons bond affects not only the actual synthesis, but also the resulting properties of the formed compounds based on continuous conjugation between the bonded groups.

As summarized hereafter, applicants believe that the synthesis of Compound X in Example 4 (and similar compounds) of EP '980 is not possible because bonding through the cylopentane in the 9-position of Compound X is subject to a large steric hindrance which does not favor bonding at that position. The large, flanking fused phenyl groups are ortho to the -CH-bonding position and interfere with the link to the phenanthroline skeleton. It is believed that rotation of the fluorene molecule during attempted linking is inhibited.

To the contrary, the present claimed compounds are joined by bonding one of the flanking phenyl groups to phenanthroline skeleton. Rotation of the fluorene molecule upon bonding to the phenanthroline is possible, thus enabling bonding to occur.

Secondly, in the phenanthroline compound of the present invention the phenanthroline skeleton is substituted with a desired group, at a position such that conjugation extends over the entire molecule. This feature results in better electron transporting properties and provides a device (having the instant compounds) with enhanced performance such as high efficiency, high luminance, and high durability.

To the contrary, EP '980, and the corresponding U.S. Patent No. 6,972,334, teach a bathophenanthroline compound substituted with fluorenyl groups at the 9-position of the fluorenyl group. This feature is shown in Compounds 133-137 of U.S. Patent No. 6, 972,334 and similar substitution is shown through a methylene bonding group for Compounds 173-176. In

such compounds the respective phenanthroline and fluorene rings are bonded through a CH group and, therefore, are not conjugated. Accordingly, it is understood that such compounds' electron transporting property, when formed into a thin film, is very low.

Wherefore, the amendment should be entered, the claims should be allowed and the case passed to issue.

Applicants' undersigned attorney may be reached in our New York office by telephone at (212) 218-2100. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,

/Peter Saxon/
Peter Saxon
Attorney for Applicants
Registration No.: 24,947

FITZPATRICK, CELLA, HARPER & SCINTO
30 Rockefeller Plaza
New York, New York 10112-3800
Facsimile: (212) 218-2200

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